

1.0 INTRODUCTION

1.1 General Overview

Decker Energy, LLC wishes to construct a new 37.5MW Biomass Facility with attendant structures on a 29-acre parcel of land located in Plainfield, Connecticut. The facility will be fueled solely by wood (biomass) and utilize fluidized bed gasification technology. Cooling water for the facility will be withdrawn from the Quinebaug River, which is located approximately two miles to the west of the facility site (Figure 1-1).

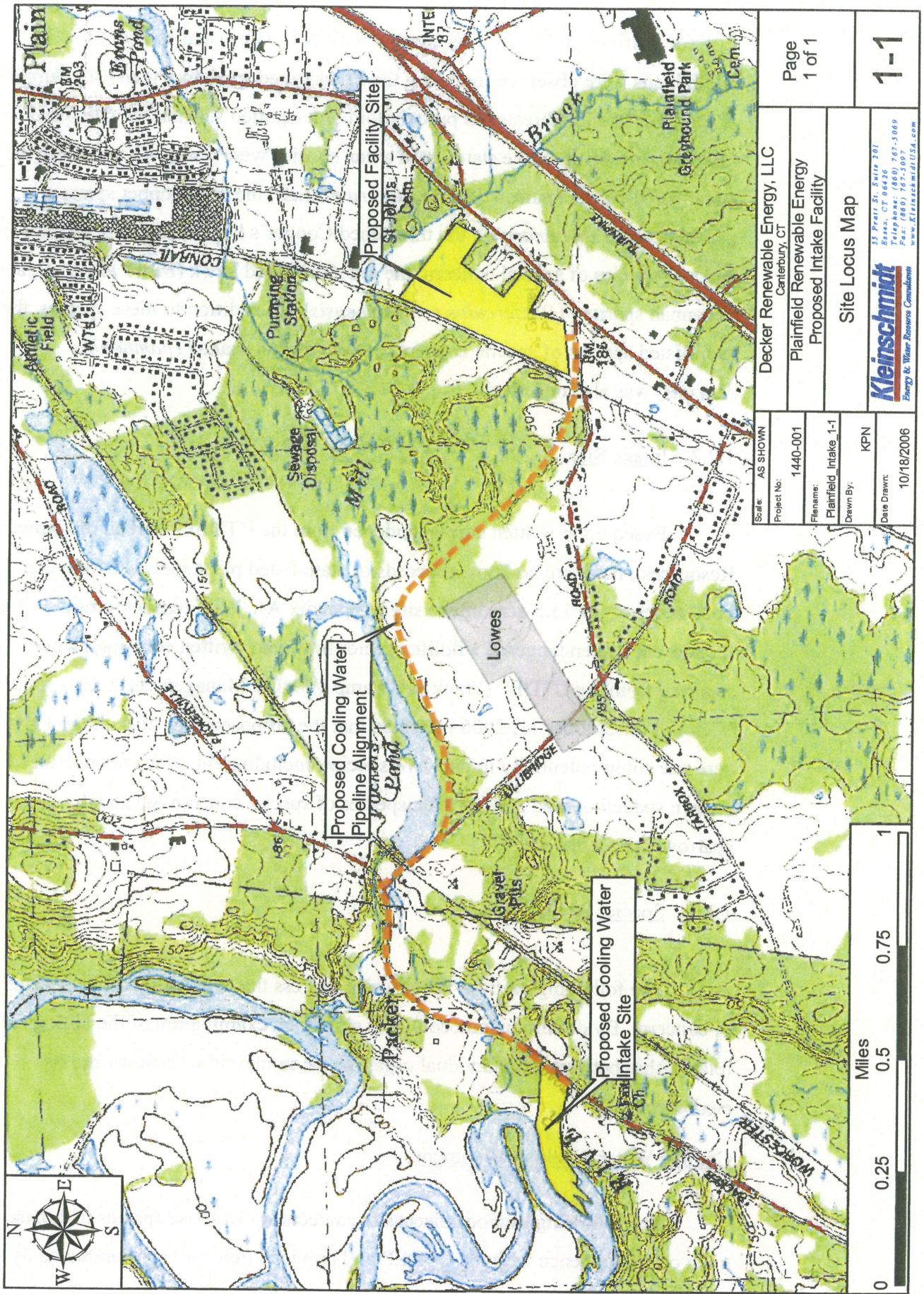
As proposed, the cooling water pipeline will be constructed entirely within the shoulder of Mill Brook Road and Packer Road, spanning the approximately 2.5 miles from the 29 acre power plant site to the undeveloped 15.5 acre Man-Burch property (intake site), which is situated in the Town of Canterbury. The cooling water intake and discharge pipes will be situated in the center of the river adjacent to the 15.5 acre intake site, while the pump house and attendant access drive will be constructed on the site itself. It is presently estimated that the peak withdrawal rate will equal 0.95 million gallons per day (MGD).

1.2 Rare, Threatened, and Endangered Species

In response to the proposed activities along the approximately 2.5 mile long cooling water pipeline alignment and upon the 15.5 acre site the State of Connecticut Department of Environmental Protection Natural Diversity Database was contacted regarding the presence of rare, threatened, and endangered species that could potentially be impacted. The following sections summarize the species identified within each portion of the proposed project.

1.2.1 Cooling Water Pipeline Alignment

Rare, threatened, endangered, and special concern species have been documented within the vicinity of the proposed cooling water pipeline alignment. Specifically, at a nearby 200+ acre site on Mill Brook Road (upon which the



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Decker Renewable Energy, LLC Canterbury, CT
Plainfield Renewable Energy Proposed Intake Facility
Site Locus Map
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Lowe's distribution facility was constructed), two state-listed species of amphibians were observed including the Endangered spadefoot toad (*Scaphiopus holbrookii*) and the threatened pure diploid blue-spotted salamander (*Ambystoma laterale*). In addition, five state-listed avian species were observed, including the endangered vesper sparrow (*Pooecetes gramineus*); the grasshopper sparrow (*Ammodramus savannarum*); the threatened Cooper's hawk (*Accipiter cooperi*); and two species of special concern, the red shouldered hawk (*Buteo lineatus*); and Savannah sparrow (*Passerculus sandwichensis*). In addition to these species, the state-listed species of special concern, eastern ribbon snake (*Thamnophis sauritus*) was also observed.

1.2.2 Intake Site

Based upon written correspondence from the CTDEP (Bureau of Natural Resources), there are no known records of state-listed plant species within the boundaries of the 15.5 acre intake site (Appendix A). With respect to rare, threatened, and endangered wildlife species however, written correspondence received from the CTDEP (Franklin Swamp Wildlife Management Area – Julie Victoria) on October 11, 2006 indicated that the proposed activities on the 15.5 acre site could potentially impact two species, including the state endangered eastern spadefoot toad and the state species of special concern Savannah sparrow (Appendix A).

1.2.3 Species Autecology

The following sections specifically address the autecology of the species of concern. By definition, autecology is simply an examination of the biological relationship between an individual organism or an individual species and its environment.

Cooling Water Pipeline Alignment

The following sections discuss the autecology of those species that, based upon correspondence with the CTDEP and previous field surveys conducted by

others, exhibit the potential to occur along the approximately two mile long cooling water pipeline alignment. In that the eastern spadefoot toad and the savannah sparrow have also been documented within the vicinity of the proposed cooling water pipeline alignment, life history descriptions are only provided in the intake site section.

Ambystoma laterale

Suitable habitat for the blue spotted salamander includes *Acer rubrum* (red maple) swamps situated along stream borders, with approximately 90–100% canopy cover. It is worth noting that this species will also utilize other wetland types that are in close proximity. Mating takes place in early spring and individual egg masses may contain from 1-30 eggs that are scattered throughout the pool.

Thamnophis sauritus

Ribbon snakes can be found along the edges of streams, lakes, ponds, and marshes. Their diet consists primarily of frogs and salamanders, which they actively stalk and pursue, although fish and insects are also taken. Given their preference for wet habitats, ribbon snakes tend to be most active during the spring. If summer weather dries up their environment they may become dormant until conditions improve. Ribbon snakes are comfortable both in and out of water and are adept swimmers. They may be found basking on logs, hummocks or muskrat lodges, and escape rapidly into dense cover or open water if threatened.

Pooecetes gramineus

Breeding vesper sparrows are characteristic of relatively dry and sparsely vegetated areas with scattered tall structures used for song perches. These features may be found in a variety of habitats. In eastern North America, breeding pairs are most frequently found in pastures, hayfields, and along the edges of cultivated fields where hedgerows, scattered trees, power lines, or other

tall structures can be used as song perches. However, they have been found in other habitats, including fallow fields in early stages of succession, gravel pits, golf courses, young pine plantations, open disturbed woodlots, and reclaimed strip mines. Protection of open grassland areas is essential for maintaining breeding populations of vesper sparrows. Keeping fields open and free of woody vegetation is critical. Altering hayfield mowing practices or harvest schedules can provide continued use of hay, maintain the open habitat, and prevent the accidental destruction of nests or young during the breeding season.

Ammodramus savannarum

Grasshopper sparrows breed in grassland, upland meadow, pasture, hayfield, and old field habitats. Nesting grasshopper sparrows may occur on agricultural lands and airports where such habitats occur. Although grasshopper sparrows may use small grasslands, open areas of over 40 hectares (100 acres) are favored. Optimal habitat for these sparrows contains short- to medium-height bunch grasses interspersed with patches of bare ground, a shallow litter layer, scattered forbs, and few shrubs. Clumped grasses, such as poverty grass (*Danthonia spicata*) and broom-sedge (*Andropogon virginicus*), provide cover and foraging areas and are consequently favored over sod or matting grasses. In addition, orchard grass (*Dactylis glomerata*); alfalfa (*Medicago sativa*); red clover (*Trifolium pratense*); and lespedeza (*Lespedeza* spp.) provide suitable sparrow habitat. Shrubs, fence posts, and tall forbs are used as song perches. However, habitats may become unsuitable for nesting grasshopper sparrows if shrub cover becomes too dense. Grasshopper sparrows have steadily declined as dry, grassy uplands and farms have reverted to forests or have been replaced by developments. As with other ground-nesting birds, high populations of predators like raccoons, skunks and feral or free-roaming housecats have also contributed to this species' decline.

Accipiter cooperii

The Cooper's Hawk breeds in deciduous, mixed, and coniferous forests,

and appears to prefer those forested stands that are interrupted by meadows and other clearings. This species is becoming more common in suburban and urban areas.

Buteo lineatus

Red-shouldered hawks usually inhabit mature deciduous or mixed deciduous-conifer forests and swamps. They build their nests 6 to 15 meters (20 to 60 feet) above the ground in the branches of deciduous trees in wet woodland areas. They prefer to have dead trees nearby, where they can perch and obtain an unobstructed view of the forest floor.

Intake Site

The following sections discuss the autecology of those species with the potential to occur on the 15.5 acre intake site, as indicated by the CTDEP.

Scaphiophus holbrooki

Preferred habitats for the Eastern spadefoot toad include sandy or loose (friable) sandy soils found in farmlands, meadows, forests, and dunes and the breeding period for this species initiates in April or May during heavy precipitation events and continues until August (Tynning, 1990). A female will typically lay 1,000 to 2,500 eggs at a time in masses of 6 to 110 in irregular strings near or in vegetation within temporary pools (Tynning, 1990). Breeding pools can include "classic" vernal pools or more ephemeral pools formed in low-lying areas following heavy rain events.

This species is, however, rarely observed outside of the breeding period and is nocturnal. As such, the presence/absence of this species is typically documented in the field solely through evidence of breeding activity and vocalizations within suitable habitat (Tynning, 1990). With respect to the vocalization, it is characterized by an explosive grunt, is low-pitched, maintained for a short duration, and repeated at short intervals. Based upon

tape-recorded vocalizations of the eastern spadefoot toad, the call is comprised of a series of guttural “*wahnk*” sounds.

The eastern spadefoot toad possesses an elongated, sickle-shaped “spade” on each hind foot, which is used for digging. Two poorly defined yellowish lines running down the back are usually present. When compared to the true toads (*Bufo*) spadefoots are soft bodied and have smoother skin. Perhaps the most distinctive feature however, is the presence of vertical pupils, whereas those of the true toads are horizontal. Furthermore, the eastern spadefoot toad lacks paratoid glands, which are typically present on the sides of the head in bufonid toads.

Passerculus sandwichensis

The savannah sparrow is a grassland generalist and is typically found in a variety of grassland habitats, ranging from heathland to farmland. Unlike many grassland birds, savannah sparrows use fields of all ages. Although each pair has a territory size of one to two acres, they require relatively large areas of open space (20 to 40 acres in size) for breeding habitat.

2.0 METHODS

The proposed cooling water pipeline interconnect route and the 15.5 acre intake site were surveyed for potentially suitable habitat for the species of interest by a Kleinschmidt Associates (Kleinschmidt) ecologist on October 16, 2006. A resume citing the surveyor's qualifications is provided in Appendix B. The field activities were geared towards characterizing habitat composition, identifying habitat types, and assessing their potential to support the species of interest, either directly or indirectly. The survey was conducted during a single, eight-hour period during cool and sunny conditions.

2.1 Habitat Sampling

All habitat types encountered along the cooling water pipeline ROW alignment and upon the intake site were characterized with a qualitative, meander survey. Tree, shrub, herb, fern, lichen, and moss species observed within each habitat type encountered were identified to the level of species where possible. Photographs of each habitat type are presented in Appendix C.

2.2 Rare, Threatened, and Endangered Species

Rare, threatened, and endangered species observations were made concurrently with the characterization of habitat types. Given the reclusive nature of many of these species, and the absence of certain species due to seasonal migration, e.g. sparrows, the field investigation consisted solely of characterizing patch types and assessing the degree to which they could support these species either directly or indirectly.

3.0 RESULTS

3.1 Habitats

3.1.1 Cooling Water Pipeline Alignment

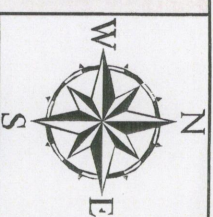
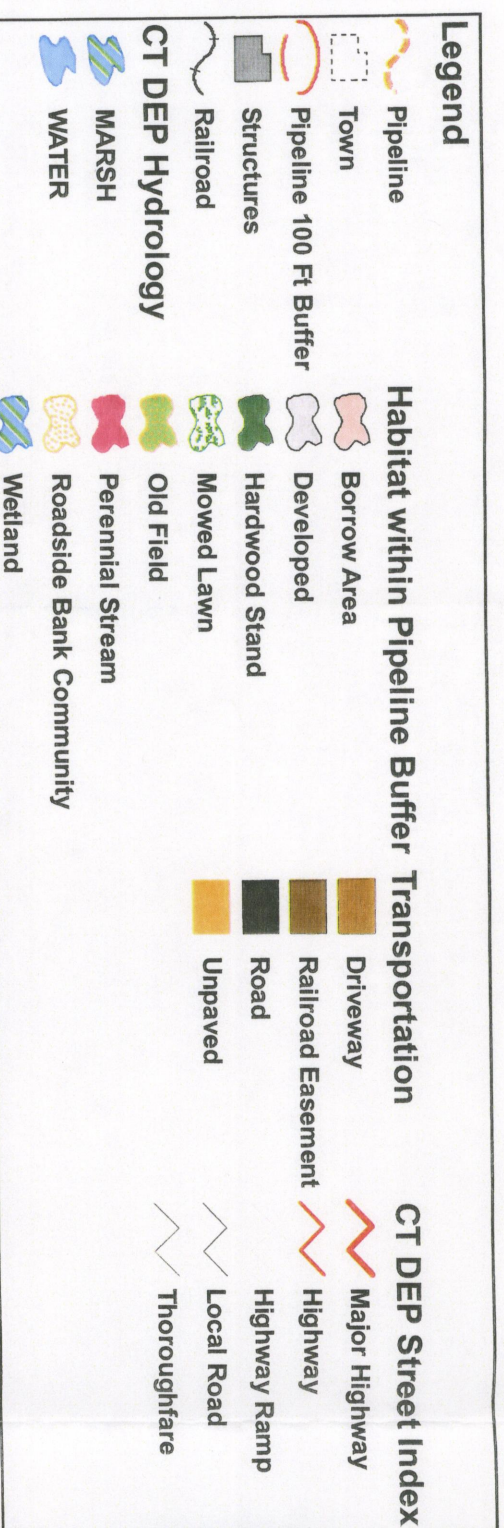
The cooling water pipeline alignment will be constructed entirely within the shoulder of both Mill Brook Road and Packer Road. In all, the edges of five plant community types are immediately adjacent to the proposed alignment route: (1) roadside bank community; (2) borrow area; (3) old field; (4) wetlands; (4) hardwood forest; and (5) perennial stream (Figure 3-1). Given their proximity to the road, many of the edge habitats were extremely disturbed and characterized by a suite of ruderal species and naturalized exotics.

Roadside Bank

The roadside bank community was established following the construction of Mill Brook Road and is comprised of a standard mixture of herbaceous species typically used in roadside soil stabilizing efforts. Dominant species include *Vicia cracca* (vetch), *Festuca rubra* (fescue), and infrequently occurring herbs such as *Aster dumosus* (bushy aster). A significant proportion of this community occurs along the newly constructed segment of Mill Brook Road.

Borrow Area

This community was observed within a small sand borrow area adjacent to the Mill Brook Road. Although sparsely vegetated, the few scattered plant species observed include mugwort, Faber's foxtail, *Schizachyrium scoparium* (little bluestem), and *Danthonia spicata* (poverty grass).



Old Field

The old field community is present along Mill Brook Road immediately across from the Lowe's distribution facility. As it occurs along the shoulder of the road, the plant community is extremely disturbed and includes a number of ruderal species and naturalized exotics. Dominant plant species in this community include *Solidago canadensis* (gray's goldenrod), *Setaria faberii* (Faber's foxtail), vetch, and *Artemisia vulgaris* (mugwort).

Wetlands

A total of seven wetland areas were observed along the proposed pipeline alignment including four associated with Mill Brook Road and three associated with Packer Road. In all instances, the wetlands are situated at the base of the roadbed grade and range from 2–40 feet from the edge of pavement. The following sections describe each of the wetlands as they were encountered along the pipeline route starting from the 29 acre facility site and ending at the proposed 15.5 intake site situated on Packer Road.

The first two wetland areas (Wetlands 1 and 2) are part of a larger wetland complex that once supported dense stands of *Chamaecyparis thyoides* (Atlantic white cedar) and are located at the base of a steep roadway grade, approximately 30 – 40 feet from the edge of pavement. The cedar stands are now dead however, and large expanses of standing dead cedar stems can presently be observed in the swamp. At the every edges of the two wetland areas, plant species including Atlantic white cedar saplings were observed, in addition to red maple; *Carex stricta* (tussock sedge); *Vaccinium corymbosum* (highbush blueberry); *Populus tremuloides* (quaking aspen); and *Pinus strobus* (white pine). Water levels were very high in the wetland at the time of the field observation and are higher than might typically be encountered in this wetland type.

The third wetland observed (Wetland 3) is a small wetland community located immediately southeast of Packer Pond that has developed in a bowl-like

depression. The edge of this wetland occurs approximately 10–15 feet from the edge of Mill Brook Road and appears to be hydrologically associated with Packer Pond. Plant species were widely scattered in this wetland and include *Osmunda cinnamomea* (cinnamon fern); highbush blueberry; and red maple. The water table in this wetland appears to fluctuate widely, which was evidenced by the hummock – hollow topography and the complete absence of a herbaceous layer. The fourth wetland area (Wetland 4) is associated with a somewhat braided stream network that discharges from Packer Pond and is highly disturbed as evidenced by soil excavation. The stream channel is situated approximately 10 feet from the edge of Mill Brook Road. The plant species observed along the stream network are indicative of disturbance and a range of inundation tolerance. Shrub species included *Rosa multiflora* (multiflora rose) and *Lonicera tatarica* (Tatarian honeysuckle), while the dominant herbs included *Impatiens capensis* (spotted touch-me-not).

The wetland areas observed along Packer Road are associated with the drainage from Packer Pond. The first wetland encountered (Wetland 5) was characterized as a scrub shrub wetland which is situated approximately 15 feet from the edge of Packer Road, the second wetland (Wetland 6) was characterized as a mosaic of palustrine emergent, open water, and palustrine forested red maple patch types and is approximately 5–10 feet from the edge of the road; and the third wetland area (Wetland 7) includes an area of open water bordered by an extremely narrow emergent-dominated fringe. Wetland 7 is located approximately 25 feet from the edge of the road, while the associated drainage ditch is approximately five feet from the edge of pavement.

Dominant plant species observed in Wetland 5 include *Cornus amomum* (silky dogwood) with very few instances of *Amelanchier canadensis* (serviceberry). Dominant herbs along the edge of the palustrine scrub shrub wetland (nearest Packer Road) include *Polygonum sagittatum* (tear thumb). Wetland 6 was the largest wetland observed along the pipeline alignment. Plant species observed in the emergent patches included *Typha latifolia* (broad leaf cattail), while the dominant species in the red maple swamp included red maple,

highbush blueberry, and cinnamon fern. As observed in the field, open water portions of Wetland 7 are separated from Packer Road by a soil berm and a 3-foot wide drainage ditch. Water from Wetland 7 discharges beneath Packer Road and into Wetland 6 and the drainage channel appears to be regularly maintained by the Town of Canterbury.

Hardwood Forest

This community occurs along the very edge of Mill Brook Road near Packer Pond and Packer Road. This community was occasionally disturbed and an admixture of invasive species were observed. Tree species in this community include red maple, *Betula lenta* (sweet birch); *Carya ovata* (shagbark hickory); *Fraxinus americana* (white ash); *Quercus alba* (white oak); *Acer saccharum* (sugar maple); *Ostrya virginiana* (American hophornbeam); *Q. rubra* (northern red oak); and occasionally *Pinus strobus* (white pine), with scattered shrub species such as *Viburnum recognitum* (northern arrowwood). Along the edges of this stand type disturbance tolerant species become more prevalent including *Acer platanoides* (Norway maple); *Polygonum cuspidatum* (Japanese knotweed); multiflora rose; *Rhamnus frangula* (buckthorn); *Berberis thunbergii* (Japanese berberry); *Lonicera japonica* (Japanese honeysuckle); and *Euonymus alatus* (burning bush).

Perennial Stream

The perennial stream channel is associated with drainage from Packer Pond and discharges beneath Packer Road through a granite headwall. At the time of the field survey, the channel measured three feet in width and flow was vigorous. Water depths were estimated to be approximately eight inches in the upgradient segment of the brook. Downgradient of Packer Road, the stream flows down a steep grade and discharges into Mill Brook, which in turn discharges into the Quinebaug River. Dominant plant species observed along the banks of the stream channel include Canada goldenrod; *Alnus rugosa* (speckled alder); and cinnamon fern.

Mowed Lawn

This community was observed within the residential areas along Packer Road. Dominant species include clipped grasses such as fescue with other species including *Festuca rubra* (clover).

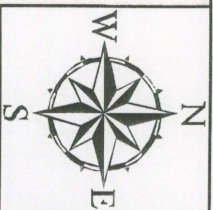
3.1.2 Intake Site

The intake site largely consists of a mosaic of (1) forested seepage wetlands; (2) floodplain forested stands; (3) mesic forested stands; and (4) upland forests. Each of these plant communities appear to have developed within a former meander scar associated with the Quinebaug River. A power line utility right-of-way (ROW) intersects with the property at its eastern edge. Within the powerline easement, scrub-shrub wetlands have developed, in addition to early successional old field/shrubland communities comprised of non-hydrophytic plant species.

The forested seepage wetlands include a suite of species characteristic of groundwater seepage including *Lindera benzoin* (spicebush) along with *Arisaema triphyllum* (jack-in-the-pulpit), and occasionally *Symplocarpus foetidus* (skunk cabbage). Tree species observed include red maple and *Ostrya virginiana* (American hophornbeam). A similar wetland type yet, with a different suite of species was observed in the northeastern corner of the property and most likely reflects edaphic differences, i.e. sandier material. Plant species observed included red maple, *Clethra alnifolia* (sweet pepperbush); speckled alder; *Hamamelis virginiana* (witch hazel); *Lycopodiella inundata* (bog clubmoss); *Polystichum acrostichoides* (Christmas fern); cinnamon fern; and discrete patches of *Sphagnum magellanicum* (sphagnum moss).

Legend

- Pipeline
- Floodplain Forest
- Hardwood Stand
- Mesic Forested Stand
- Successional Shrubland
- Scrub Shrub Wetland
- Stream Community



Notes:
1) The habitat polygons were digitized from the 2004 Black & White UConn CLEAR 0.24 meter resolution digital orthophotos and site sketches.
2) All locations are approximate

Scale: AS SHOWN	Plainfield Renewable Energy, LLC	
Project No: 1440-001	Plainfield, CT	
Filename: Plainfield Intake Hebl.mxd	Rare, Threatened and Endangered Species Survey for a Proposed Cooling Water Intake Structure	1 of 1
Drawn By: KPN	Plant Communities (Intake Site)	
Date Drawn: 11-01-2006	Kleinschmitt Energy & Water Resource Consultants 33 Pratt St. Suite 201 East, CT 06426 Tel: (860) 767-3069 Fax: (860) 767-3069 www.kleinschmittusa.com	3-2

Floodplain forests observed on the site are comprised of a suite of classic floodplain tree species including *Quercus palustris* (pin oak); *Acer saccharinum* (silver maple), and occasionally *Ulmus americana* (American elm). Shrubs observed in the more well-lit portions of the stand include *Cephalanthus occidentalis* (buttonbush) and *Cornus amomum* (silky dogwood). The herbaceous layer is very poorly developed, although scattered *Nuphar luteum* (spatterdock), cinnamon fern, *Osmunda regalis* (royal fern), and *Onoclea sensibilis* (sensitive fern) were observed.

Mesic forested stands included a mixture of tree species that occur across a range of hydrologic regimes including pin oak, red maple, American hophornbeam, and vestigial *Malus* sp. (apple) trees. Scattered herbs observed included *Veratrum viride* (false hellebore), and *Bidens frondosa* (devil's beggartick).

Isolated patches of upland forested stands were observed in the low lying and flat areas of the site and were comprised of *Fagus grandifolia* (American beech), red maple, and white pine in the overstory with a poorly developed understory. Specifically, understory plants observed included *Maianthemum canadense* (wild lily of the valley), *Lycopodium obscurum* (ground pine); *Vaccinium angustifolium* (lowbush blueberry); *Smilax rotundifolia* (greenbrier); and *Dennstaedtia punctilobula* (hay scented fern). In addition to these upland species there were occasional instances of hydrophytic plant species including *Osmunda regalis* (royal fern), cinnamon fern, and *Carex lurida* (lurid sedge). The presence of these herbaceous species in the understory could simply reflect "hollows" in the upland plant community or could be indicative of a plant community in transition from upland to wetland.

Within the powerline ROW, scrub shrub wetland have developed with smaller patches of emergent dominated communities. Dominant plant species observed include speckled alder, silky dogwood, and *Eupatorium maculatum* (spotted joe pye weed). Other plant species observed red maple saplings, *Ilex*

verticillata (winterberry); cinnamon fern; lurid sedge; *Lythrum salicaria* (purple loosestrife); and *Phalaris arundinacea* (reed canarygrass).

Upland plant communities observed in the powerline ROW include early successional shrubland and old field communities. Dominant plant species observed include *Dennstaedtia punctilobula* (hay-scented fern); *Solidago canadensis* (gray's goldenrod); *Lonicera tatarica* (tatarian honeysuckle); *Spiraea latifolia* (meadowsweet); and occasionally *Juniperus virginiana* (eastern red cedar) along the very margins of the powerline ROW.

Along the southern border of the property is a steep hill that is presently dominated by an upland mixed deciduous forested stand. Dominant tree species included the northern red oak; sweet birch; *Tsuga canadensis* (hemlock); American hophornbeam; and shagbark hickory. Within the understory *Aralia nudicaulis* (sarsaparilla); *Polystichum acrostichoides* (Christmas fern); hay-scented fern and *Mitchella repens* (partridgeberry) were observed along with scattered invasives and naturalized exotics including burning bush and Japanese berberry.

At the base of the upland forested community along the southwestern edge of the property is a coldwater stream that discharges into the Quinebaug River. Source waters for the stream originate in a large wetland complex to the east of the property at a much higher elevation. At the time of the field investigation, stream width measured 3–4 feet in width and the flow rate was moderate. Water depths were estimated to be eight inches and water temperatures were very cold, indicating that this is most likely a groundwater-fed stream. Stream substrate is comprised of sands and gravels (with some cobble) and little organic matter was present. Plant species observed along the edge of the stream channel included red maple; sweet pepperbush; and occasionally, cinnamon fern.